to Lambda "n" converter 250 to the up-stream aggregation node is achieved via the nodes internal electrical control layer and in conjunction with the local look-up table 210/switch controller circuit 245. The RF control layer assigns the packet routing and wavelength/direction for inter-node transport. The 1 x 3 wavelength packet cross-switch 215 is also able to route identified wavelength packets directly down to the bi-directional Lambda 1 to Lambda "n" converter 250, assign new wavelengths if needed, or direct the existing wavelength packets out to the wavelength packet cross-connect 265 for routing to other local nodes within the mesh. The wavelength packet cross-connect 265 provides routing between its distribution arms.

[51] Leaving the wavelength packet multiplexer 225, the newly generated multiplexed wavelength packets are forwarded to remultiplexer 220 for re-multiplexing and integration with the non-switched wavelengths leaving the 1 x 3 wavelength packet cross-switch 215. The combination of newly generated wavelength packets and non-switched wavelengths can be forwarded either to a further node down-stream or to an aggregation node up-stream. In the exemplary embodiment depicted in Fig. 2, four upstream wavelength, labeled "λ 5-8", are used for illustrative purposes. These wavelengths are indicated as both up-stream flowing wavelengths or local packets on wavelengths. In either case, the up-stream wavelengths may be optionally demultiplexed at an aggregation node. Locally generated packets on suitably selected wavelengths are inserted into the up-stream packets via a multiplexing process. Note as with the above up-stream aggregation of locally generated wavelengths, the receive side of the up-stream aggregation node also contains a set of wavelength packet header readers and 1 x 3 wavelength packet cross-switch which can alternatively direct wavelength packets to the common local distribution wavelength packet switch 235 for local customer 1's distribution, or to the bi-directional Lambda 1 to Lambda "n" converter 250 and onto the wavelength packet cross-connect 265 or alternatively may be passed through unaffected for remultiplexing back into the up-stream traffic.

[52] The availability of high-speed optical switches, optical packet header readers and wavelength demultiplexing devices provides for the opportunity to take selected wavelength-specific data packets and route them through the above described architecture to destinations different from the branch the packets arrived on. In one mode of operation, selected switches open simultaneously via a command from the node controller and the packet is able to travel all the way to the wavelength packet cross-connect interface where the packet leaves the local distribution node and travels to another node thereby allowing packets to migrate from node to node in different directions, and providing the structure of a mesh-like network. This feature requires each local node look–up table 210 to have some limited high-level knowledge of the other node locations and their customer addresses and assigned wavelength/directions.

[53] Fig. 4 illustrates the communication between nodes A and B using a common wavelength packet cross-connect (between nodes A and B) 265. Node A is shown on the left of Fig. 4 and node B is shown on the right of Fig. 4. The 1 x 3 wavelength packet cross-switch 215 is able to route wavelength packets to the local distribution wavelength packet cross-switch 235 or to the common wavelength packet cross-connect 265. Wavelength packets routed to the local distribution wavelength packet cross-switch 235 are then routed to the wavelength packet multiplexer 225 and thereafter outgoing from node A. Wavelength packets from node A routed directly through the common wavelength packet cross-connect 265 are forwarded to node B through node B's Lambda 1 to Lambda "n" converter and packet generator 250 and up-stream from node B. Wavelength packets from node B routed directly through the common wavelength packet cross-connect 265 are forwarded to node A through node A's Lambda 1 to Lambda "n" converter and packet generator 250 and up-stream from node A.

[54] In normal metropolitan access operation, a packet going to or coming from the greater network will typically follow a prescribed path defined by the primary distribution/aggregation node packer-header reading and setting up of the route path via the radio layer. Due to wavelength crashes and/or link failure due to

physical or weather related events, the optimum path may not be available. Thus, the ability to route around a link problem by allowing specific customer packets that can come in from a different direction and the ability to change the wavelength being transmitted allows for a significantly higher degree of link redundancy and thereby link availability. Fig. 5a depicts a FSO based local mesh network showing, in particular, the redundancy available in such a configuration.

[55] With the ability to locally route wavelength packets for transmission downstream from the network and up-stream, back to the network, as well as local node-to-node and local service domain-to-local service domain via fiber, FSO, and millimeter wave radio; many different mesh configurations and technology mixes are possible of which the most rudimentary are shown in Figs. 5a - 5d. These figures are illustrative only and do not represent all the mesh configurations possible with the above described architecture.

[56] Fig. 5a is an exemplary local mesh aggregation and distribution architecture. Only one local service domain 515 (described later) will be labeled to keep the figure uncluttered. It can be assumed that all of the local service domains are similarly labeled. Fig. 2 depicted an exemplary embodiment of a primary distribtuion/ aggregation node. As can be readily seen from Fig. 5a, a primary distribution/aggregation node 510 is a node on a primary fiber metropolitan ring 505. A primary distribution/aggregation node 505 also interfaces to and interacts with a local service domain 515 via a secondary aggregation node 530. The local service domains each have a pair of secondary distribtuion/aggregation nodes 520 which have the same function as a primary distribution/aggregation node 510 in an event of a failure of the primary fiber metropolitan ring 505 or any portion thereof. The secondary distribution/ aggegation nodes 520 connect a local service domain 515 to a redundant path metropolitan ring back-up 525. Each of the filled in circles in local service domain 515 is a tertiary aggregation node 535, with one such node labeled in local service domain 515. A data packet path would typically follow a path from the primary fiber metropolitan ring 505 to a primary distribtuion/aggregation node 510 to a secondary distribtuion/aggregation node